

Little
1865

AN INQUIRY
INTO
THE CAUSES
OF THE
HIGH DEATH RATE IN LEEDS.

BY
JAMES BRAITHWAITE, M.D., LOND.

PRICE SIXPENCE.

LEEDS:
SOLD BY ANGELO MEGSON, 75, BRIGGATE,
AND BY
H. W. WALKER, 37, BRIGGATE.

1865.

LEEDS UNIVERSITY LIBRARY

Classmark:

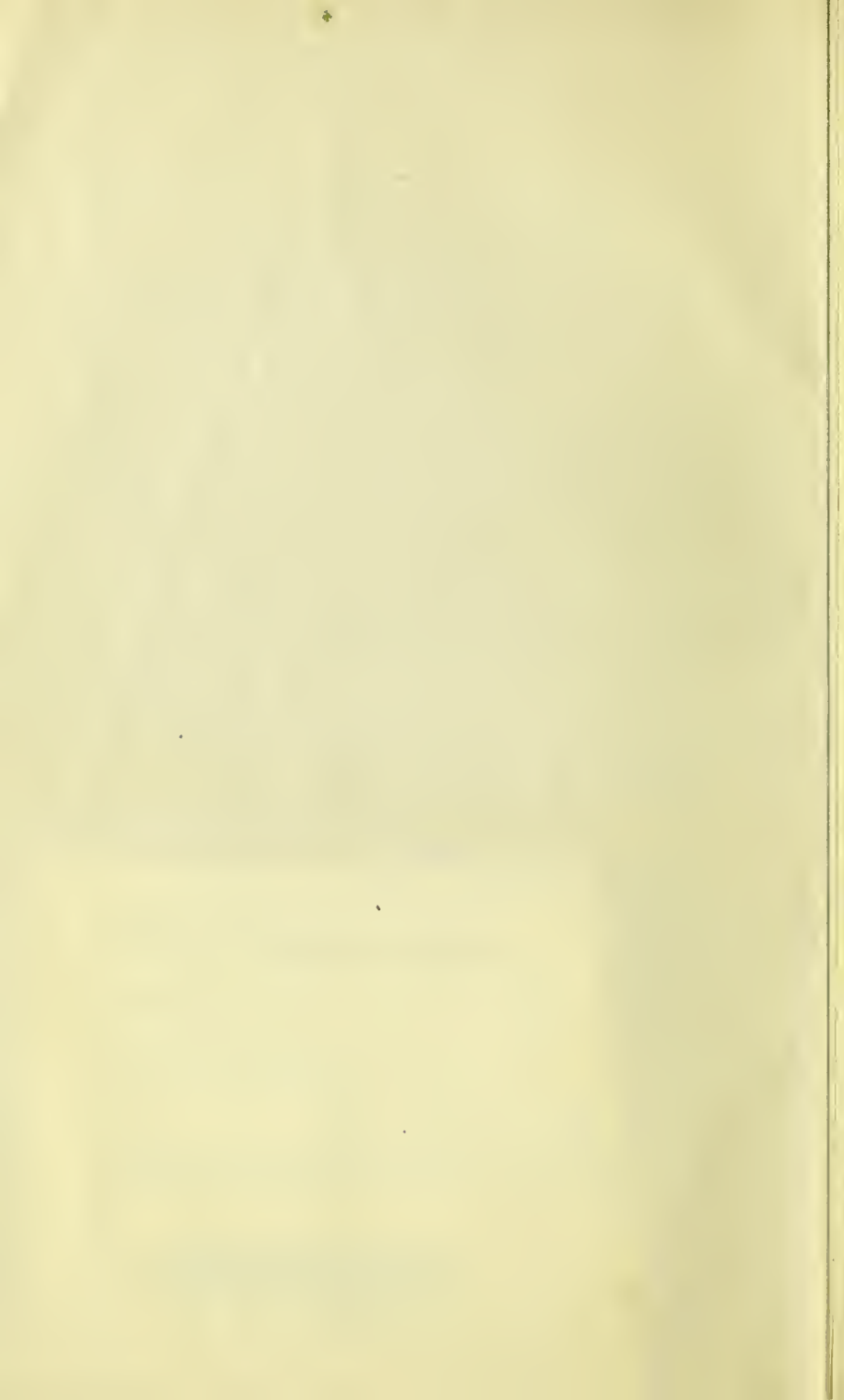
Brotherton Collection

Yorkshire H-Lee-3.6 BK



3 0106 01388 4191

THE CAUSES
OF THE
HIGH DEATH RATE IN LEEDS.



AN INQUIRY
INTO
THE CAUSES
OF THE
HIGH DEATH RATE IN LEEDS.

BY
JAMES BRAITHWAITE, M.D., LOND.

LEEDS:
PRINTED BY EDWARD BAINES AND SONS.
—
1865.

BROTHERS
COLLECTION
UNIVERSITY

AN INQUIRY INTO THE CAUSES OF THE HIGH DEATH RATE IN LEEDS.

WHEN first I began to investigate the subject of the sanitary condition of Leeds, and of the causes which produce the high rate of mortality in the town, I had no idea of anything further than my own instruction. The importance of the subject, however, induces me to bring the results of my investigation before the public, who, by their anxiety regarding the matter, first directed my attention to it. Now that a return of the deaths in Leeds and other places is published weekly, we constantly hear of the high death rate of the town. Thus, in the "Quarterly Summary of Births and Deaths in the Borough of Leeds during the thirteen weeks ending 1st April, 1865," published in the *Leeds Mercury* of May 10th, the following passage occurs:—

"The death rate which prevailed was, as stated above, 32·3, or nearly 4 per 1,000 higher than the rates in London, Salford, Bristol, and Birmingham, and in the general town population of England. Such an excess is well worthy of the gravest attention. There is certainly not nearly so much destitution in Leeds as in London; therefore, in a hard winter, other conditions being equal, the mortality of the former ought to compare favourably with that of the latter. The population of Leeds is not nearly so closely packed as in the densest parishes of London. However it may be, the excessive mortality in Leeds is, to a great extent, within its own control, and who shall say it is not worth an effort to exercise that control effectually?"

Many other passages of a similar character occur in the letters which have been written to the public papers by private individuals; but, hitherto, no attempt has been made to go thoroughly to the root of the matter, and to ascertain the exact relative effect of the various causes of mortality. It is true that much is known vaguely, but little with that certainty which is necessary in such matters. It is known, for instance, that there are many deaths annually from fever and consumption; but no one can say how many, or in what parts of the

town the fever has occurred, or amongst what classes of the community the deaths from consumption are most numerous. No one can say, with certainty, whether the high rate of mortality depends upon the deaths of adults or of children, or of both; or what disease or diseases prove most fatal according to age. The reports of the Registrar-General do not furnish this information, consequently opinions upon these questions are uncertain, not being founded upon actual knowledge. It is obvious that that cannot be within control, the extent and all the details of which are not accurately known. By the permission of the chairman of the Nuisance Committee, I have obtained the returns of the causes of death which have now been made for a period of five years, and have classified every death according to the disease which produced it, and also according to the age at which, and the season of the year, and the year itself in which, it occurred. By this means, the exact relative mortality, from every disease or class of diseases, can be determined. I have also the residence of every fatal case of fever, by which means the fever districts of the town may be mapped out, and their relation to defective drainage and nuisances ascertained.

The deaths from consumption,—2,494 in number,—I have classified according to occupation and sex, in order to ascertain the conditions which favour the production of the disease. Much of my information has, of course, been derived from the Registrar-General's Reports, especially concerning other towns than Leeds. But these reports do not make any distinction between the causes of death of children and those of adults, except in England generally and in London. I shall first endeavour to point out the exact position of the town relatively to other towns and districts, especially separating the mortality amongst children from that amongst adults. I shall afterwards pass on to consider the causes of mortality separately, and, so far as can be done within the limits of a pamphlet, show how far each of the most important is remediable, if it is so to any extent.

It must be understood, in reading the following pages, that the district of Hunslet is almost identical with that part of the borough not contained in the township, as will be seen by the accompanying woodcut, which also shows the boundaries of the other registration districts in the neighbourhood of Leeds.

It will be seen that when Tadcaster, Ripon, Bradford, &c., are spoken of, a large district of country around them is also included. When Leeds, however, is mentioned in the Registrar-General's Reports (until the commencement of this year), *the township only is meant, and Leeds thereby is made to appear much more unhealthy than it really is.* If the reader will look

at the woodcut he will see that the proper plan is to include the registration district of Hunslet along with that of Leeds. This I have done in all the tables in this Essay, calling it the Borough of Leeds. Hunslet, or the parts of the borough outside the township, and the township itself, are also given separately.



For the purpose of comparing Leeds with other towns, I take the eight years, 1855 to 1862, because in the last two years we cannot ascertain the causes of death, nor the ages at death, in other towns than Leeds, and because prior to 1856 the Registrar-General did not report the causes of death at all, except in England generally and in London. Moreover, these eight years were average healthy ones all over the country, being undisturbed by any of the great epidemics which preceded them, or by the epidemics of scarlet fever and smallpox which have lately prevailed.

The following table shows the average number of deaths per 1,000 of persons of all ages during the eight years 1855 to 1862.

Besides the five great cities or towns of London, Liverpool, Manchester, Sheffield, and Birmingham, I have chiefly selected places in our own neighbourhood. The Isle of Wight is taken because, judging from its total death rate, it is apparently the healthiest, or one of the healthiest places in England.

TABLE I.

Showing the number of deaths annually, at all ages, out of every 1,000 persons living, on an average of the eight years ending December 31st, 1862:—

<i>The whole of England</i>	21·8	West-Riding	23·4
Isle of Wight	16·5	Halifax	23·6
Tadcaster	18·56	Bradford	25·04
Ripon	19·13	Leeds (Borough)	25·2
Knaresborough	21·66	Birmingham	26·29
Huddersfield	21·88	Leeds (Township)	26·7
London	23·02	Sheffield	27·2
Hunslet	23·10	Manchester	31·92
Otley	23·12	Liverpool	32·31

This is the kind of death rate which is usually accepted as representing accurately the healthiness or unhealthiness of a town. Much misconception, however, is liable to result from this wholesale plan. For instance, the death rate of London is lower than that of Leeds, but the former is a much more unhealthy place than the latter, omitting the deaths of young children in both. *A high or low total death rate depends chiefly upon the mortality amongst children.* The ratio between the deaths of children and of adults varies, however, considerably in different places, as will be seen from the following table.

TABLE II.

Showing the number of deaths of children under Three and under Ten years of age out of every 1,000 deaths of persons, at all ages, on an average of the eight years ending December 31, 1862:—

	UNDER THREE.	UNDER TEN.
<i>The whole of England</i>	361	451
Ripon	261	316
Isle of Wight	256	320
Otley	298	374
Tadcaster	286	379
Knaresborough	240	384
London	386	473
Halifax	369	474
West-Riding	398	484
Bradford	437	508
Huddersfield	425	517
Manchester	431	518
Leeds (Township)	437	523
Leeds (Borough)	439	528
Sheffield	434	533
Hunslet	442	534
Liverpool	432	537
Birmingham	442	541

Thus it appears that in the whole of England $\frac{451}{1000}$ of the total death rate represents the mortality which occurs amongst children under ten years of age, whilst in Leeds $\frac{525}{1000}$ represents the mortality under the same age in the township, and $\frac{534}{1000}$ in the rest of the borough. This, however, is only comparative, and in the next table, which shows the *actual* death rate of children under ten years of age, the true relative position of the township and Hunslet districts to each other and to other districts is seen.

TABLE III.

Showing the average annual death rate of children under Ten years of age relatively to every 1,000 persons living, at all ages, on an average of the eight years 1855 to 1862:—

<i>The whole of England</i>	9·8	Huddersfield	11·31
Isle of Wight	5·28	Hunslet	12·33
Ripon	6·04	Bradford	12·72
Otley	6·64	Leeds (Borough)	13·3
Tadcaster	6·95	Leeds (Township)	13·96
Knaresborough	8·31	Birmingham	14·22
London	10·88	Sheffield	14·49
Halifax	11·18	Manchester	16·53
West-Riding	11·3	Liverpool	17·35

If these numbers are deducted from the total death rates at all ages, we have the proportion of the death rate which represents the mortality of persons *above* ten years of age.

TABLE IV.

Showing the average annual death rate of persons above Ten years of age relatively to every 1,000 persons living, of all ages:—

<i>The whole of England</i>	12·0	Bradford	12·32
Huddersfield	10·57	Halifax	12·42
Hunslet	10·77	Sheffield	12·71
Isle of Wight	11·22	Leeds (Township)	12·74
Tadcaster	11·61	Ripon	13·09
Leeds (Borough)	11·9	Knaresborough	13·35
Birmingham	12·07	Otley	14·48
West-Riding	12·1	Liverpool	14·96
London	12·14	Manchester	15·79

It must not be forgotten, in estimating the deaths of children, that the relative number varies in different places. This may be ascertained by means of the birth rate. Table III., therefore, does not state the case quite accurately. In the following table is shown what would be the death rate amongst children, if the birth rate were the same in all. The towns and districts are in the same order as they are in Table III., but it will be seen that this element in the question somewhat alters the relative position of some of them, especially of the West-Riding and of the borough and township of Leeds.

TABLE V.

Showing the annual death rate amongst children under Ten years of age, on the supposition that the birth rate in all is the same. The places are in the same order as in Table III.

<i>The whole of England</i>	8·5	Huddersfield	9·3
Isle of Wight	5·4	Hunslet	9·4
Ripon	5·7	Bradford	11·4
Otley	5·2	Leeds (Borough)	10·5
Tadcaster	6·9	Leeds (Township)	11·0
Knaresborough	8·8	Birmingham	10·3
London	9·5	Sheffield	10·4
Halifax	9·5	Manchester	13·1
West-Riding	7·9	Liverpool	15·3

As none of the preceding tables make any distinction between deaths occurring in youth or early manhood and those

in old age, I have constructed the following table, which shows the chances of reaching old age amongst persons already arrived at ten years of age, in Leeds, as compared with other towns and districts.

TABLE VI.

Showing the number out of every 1,000 deaths at all ages above Ten, of deaths above 65, on an average of the eight years ending December 31st, 1862:—

<i>The whole of England</i>	353	Halifax	299
Ripon	477	Leeds (Borough)	275
Tadcaster	432	Birmingham	261
Knaresborough	402	Bradford	257
Isle of Wight	369	Leeds (Township)	254
Huddersfield	353	Sheffield	224
Otley	335	Manchester	220
West-Riding	334	London	219
Hunslet	303	Liverpool	161

I think it is evident from a study of these tables that the proper way to judge of the sanitary state of a town is to take the death rate amongst children; and, then, either the average age at death of all who reach a certain age (as ten), or—what amounts to the same thing—the relative number who reach old age.

It appears from these tables that the borough of Leeds cannot be called unhealthy when only the mortality amongst persons above ten years of age is considered, seeing that the mortality to every 1,000 persons living, at all ages above ten, is even lower than that of the West-Riding. This, however, is owing to the healthiness of the extra-urban parts of the borough (Hunslet, Table IV.), for the township itself stands lower in the list. It appears, however, from Table V., that a much smaller number reach 65 in Leeds than in the rest of the West-Riding, or in Halifax or Huddersfield; but it stands higher in this respect than Birmingham, Bradford, Sheffield, Manchester, London, or Liverpool.

We see from Table III. why there is such a high total death rate, Leeds being only exceeded in the relative number of deaths of children by Birmingham, Sheffield, Manchester, and Liverpool. It is worse than Bradford; but as there is a larger number of children born in Leeds relatively to the total population, it is in Table V. seen to be in reality rather more healthy than Bradford, even in respect of the mortality amongst children.

It is worthy of notice that the mortality amongst children, compared with that of adults, is much higher in the rest of the township than in the township itself, (Hunslet, Tables II. and V.) Although it is somewhat out of place here, I may observe that this is probably owing to numerous deaths from diarrhoea during the heat of summer, and to epidemics of infectious

diseases amongst children. These are produced or favoured by the numerous nuisances and defective drainage of some of the out-townships (as Bramley), which tell more upon the mortality amongst children than upon that amongst adults.

For the purpose of comparing the different districts of the borough, the following table will answer all practical purposes; it is constructed partly from materials supplied to me by Mr. Swale, partly from the Registrar-General's Reports. There are not the materials to take all from the same source. Those taken from the eight years 1855 to 1862, are probably rather more favourable than those taken from the deaths during the last three or five years.

Those places at the bottom of the list must not, however, be condemned at once, for, in some cases, the increased number of deaths probably depends partly upon a large proportion of children relatively to the total population. Thus the birth rates of the south-east and north districts of Leeds, and of Kirkstall, are all above 40 per 1,000 annually, and that of Rothwell reaches 50. Burley includes the district west of Ventnor Street, on the Kirkstall Road; a thickly populated neighbourhood, without any proper system of drainage, where, during the last three years, there have been many deaths from scarlet fever amongst children. I do not think it would stand so low could the average of the eight years 1855 to 1862, be obtained.

TABLE VII.

Showing the mortality per 1,000 in the different districts of the Borough of Leeds:—

MORTALITY PER 1,000.		MORTALITY PER 1,000.	
^a Potternewton	15.0	^c Holbeck	25.5
^a Headingley	16.0	^b Bramley	26.0
^a Chapeltown	17.0	^c Leeds West	26.3
^b Farnley	20.0	^c Kirkstall	26.8
^c Whitkirk	22.4	^c Leeds South-East	27.2
^c Wortley	22.7	^c Rothwell	27.6
^b Armley	23.0	^a Burley	29.0
^c Hunslet proper	24.3	^c Leeds North	29.5

^a On an average of the last three years.

^b On an average of the last five years.

^c On an average of the eight years, 1855 to 1862.

I find that in Chapeltown and Potternewton there have been, during the last three years, 209 deaths, at all ages; 89 of these were under 10, and 36 were above 65. This does not include that part of Meanwood usually included in the registration district of Chapeltown. In Headingley there have been 150 deaths, at all ages; 52 of these were under 10, and 38 above 65. For the purpose of comparing them with other places (see Tables II. and V.), we may put it thus:—In Headingley, out of every 1,000 deaths, 346 are in children under 10, and in Chapeltown 425. In Headingley, out of every 1,000 deaths of persons above 10 years of age, 388 are those of persons above 65 years of age, and in Chapeltown 300.

Headingley, therefore, contrasts favourably with Chapel-town. In respect of the deaths of children, Headingley would come after the Isle of Wight; that is, third in the list, and Chapeltown after Knaresborough; that is, sixth in the list. With respect to the deaths of old people, Headingley comes fourth in the list, and Chapeltown low—the eighth—below the average of the West-Riding, and even below the average of Huddersfield. Should any doubt be thrown on the accuracy of this, I can only say that the figures have been very carefully calculated and are perfectly correct. Perhaps a calculation on a longer series of years would alter the case; but there are not the materials to make it.

The Registrar-General observes: "It may be assumed with certainty that the mortality of the English people is very variable; but, under generally favourable conditions, it does not exceed 17 in the 1,000. The deaths of 17 in the 1,000 may, therefore, be considered, in our present imperfect state, *natural deaths*; and all the deaths above that number may be referred to artificial causes." So that in the township of Leeds 9·7 per 1,000, or 1,164 deaths, and in the rest of the borough 6·1 per 1,000, or 622 deaths annually are unnecessary waste of life.

It is not likely, however, that in any large town the mortality will sink, even under the most favourable circumstances, to so low a level as 17 in the 1,000, the anxiety and wear and tear of business, and the temptations to vice, being too great. I propose, after showing the effects of season on mortality, to consider the number of deaths from each separate class of diseases. The returns, however, from the out-townships have not been made for a full period of five years—some for only two—so that I am obliged to confine myself to the township alone.

The three following tables show respectively the effects of season on the total mortality of Leeds, on the deaths of those above three years of age, and on the deaths of those under three years of age.

TABLE VIII.
SHOWING THE EFFECTS OF SEASON ON THE TOTAL MORTALITY OF LEEDS.

	Jan., Feb., March.	April, May, June.	July, Aug., September.	Oct., Nov., December.
1860	—	909	767	736
1861	844	686	774	743
1862	828	777	840	987
1863	964	1091	1186	953
1864	1022	774	868	958
1865	909	—	—	—
Totals . .	4567	4237	4435	4377

TABLE IX.

SHOWING THE EFFECTS OF SEASON ON THE MORTALITY OF PERSONS ABOVE THREE YEARS OF AGE IN LEEDS DURING THE LAST FIVE YEARS.

	Jan., Feb., March.	April, May, June.	July, Aug., September.	Oct., Nov., December.
1860	—	538	398	425
1861	511	433	384	421
1862	509	459	479	560
1863	653	670	573	595
1864	651	509	437	575
1865	556	—	—	—
Totals . .	2880	2609	2271	2576

TABLE X.

SHOWING THE EFFECTS OF SEASON ON THE DEATHS OF CHILDREN UNDER THREE YEARS OF AGE IN LEEDS.

	Jan., Feb., March.	April, May, June.	July, Aug., September.	Oct., Nov., December.
1860	—	371	369	311
1861	333	253	390	322
1862	319	318	361	427
1863	311	411	593	357
1864	371	275	431	383
1865	353	—	—	—
Totals . .	1687	1628	2144	1800

It appears from Table VIII. that the winter quarter (January, February, March) and the summer quarter (July, August, September) are the two most unhealthy seasons of the year. On comparing this with the two other tables, it is explained by the fact that *the mortality amongst adults* is at its maximum in winter, and that amongst infants is at its maximum in summer*, precisely at that period when, amongst adults, it is at its minimum. The explanation of this singular fact appears on examination of the effects of season on the causes of death at different periods of life.

The two following tables show, respectively, the deaths, from all causes, in persons above three years of age, and from all the principal causes in infants. They are as accurate as it is possible to make such tables, except that I think some of the causes of death of children, in 1860 and 1861, are a little understated, but so slightly as to be of no consequence.

* I use the word "adults" here and in other places because the deaths at ages from 3 to 20 bear but a small proportion to those at all ages above 20.

TABLE XI.

SHOWING THE CAUSES OF DEATH IN PERSONS ABOVE THREE YEARS OF AGE, IN THE TOWNSHIP OF LEEDS, DURING THE FIVE YEARS ENDING THE 31ST OF MARCH, 1865.

	Consumption.	Fever (Typhoid).	Scarlet Fever and Diphtheria.	Erysipelas, Boils, and Carbuncles.	Measles.	Smallpox.	Whooping Cough.	Hydrocephalus.	Apoplexy.	Other Head and Spinal Diseases (not of Bone).	Inflammations of the Lungs and Influenza.	Diseases of the Heart.	Diseases of the Liver.	Diseases of the Kidneys.	Diseases of the Stomach.	Diseases of the Bowels and Peritoneum.	Diarrhoea and Dysentery.	Rheumatic Fever.	Scrofula, Syphilis, and Diseases of Bones and Joints not produced by Injury.	Cancer.	Childbed and consequent diseases.	Diseases of the Womb not consequent on Childbed.	Epilepsy and Convulsions.	Old Age and General Decay.	Accidents and Surgical Operations.	Other Causes and doubtful.
1860 (9 mo.)	205	94	13	7	50	6	5	24	33	92	294	71	45	30	14	37	28	11	46	30	11	4	9	70	85	47
1861 . .	274	107	12	6	14	2	—	26	58	93	435	79	60	52	24	23	61	10	62	30	22	26	15	99	109	50
1862 . .	324	154	90	4	17	3	8	12	84	99	522	98	43	47	16	16	40	11	37	23	28	21	19	108	118	65
1863 . .	327	253	367	9	25	45	9	16	89	109	465	86	47	44	29	34	79	14	40	41	35	25	20	91	143	49
1864 . .	322	130	174	23	11	29	17	15	77	115	479	110	49	55	33	46	64	20	51	33	31	23	31	93	108	55
1865 (3 mo.)	69	31	38	2	2	—	1	5	18	25	163	40	25	7	5	7	4	4	10	4	12	2	5	26	10	30
Totals .	1521	769	694	51	119	85	40	98	359	533	2363	484	267	235	121	163	276	70	246	161	139	101	99	487	573	296

TABLE XII.

SHOWING THE PRINCIPAL CAUSES OF DEATH OF CHILDREN UNDER THREE YEARS OF AGE,
IN THE TOWNSHIP OF LEEDS, DURING THE FIVE YEARS ENDING MARCH 31st, 1865.

	Convulsions.	Bronchitis, and other Inflammations of the Lungs.	Hydrocephalus and Congestion of the Brain.	Whooping Cough.	Measles.	Scarlet Fever and Diphtheria.	Serofula, Abscesses, Rickets, &c.	Dropsy.	Croup.	Diarrhoea and Dysentery.	Erysipelas.	Teething.	Tubercles.	Premature Birth.	Anæmia, Atrophy, and Debility.
1860 (9 mo.)	128	173	52	32	137	10	146	3	6	92	5	7	8	51	50
1861 . . .	217	274	85	24	23	13	120	3	12	214	7	22	42	63	49
1862 . . .	206	407	72	43	83	80	101	11	25	125	16	26	31	93	84
1863 . . .	237	267	92	47	55	178	150	4	27	261	5	30	80	98	98
1864 . . .	226	264	69	39	40	122	126	6	29	200	5	28	68	80	89
1865 (3 mo.)	71	84	27	9	2	36	35	1	9	2	1	6	11	17	22
Totals.	1085	1469	397	194	340	439	648	28	108	894	39	119	240	402	392

It appears that, numerically, the most fatal class of diseases are those the chief exciting cause of which is exposure to cold, viz., inflammation of the lungs, bronchitis, and pleurisy. I have also included under this heading all deaths from diseases of the throat produced by cold; these, however, are very few in number. The following table shows the effect of season in producing, or tending to produce, this class of diseases in infants, and in those above three years of age.

TABLE XIII.

SHOWING THE EFFECTS OF SEASON ON THE MORTALITY FROM BRONCHITIS AND SIMILAR DISEASES RESULTING FROM EXPOSURE TO COLD.

	Jan., Feb., March.	April, May, June.	July, August, September.	Oct., Nov., December.
1860 (9 mo.) .	—	80 128	41 82	52 84
1861	96 158	67 95	24 77	87 105
1862	104 158	105 105	54 89	144 170
1863	71 154	63 99	49 91	84 121
1864	74 158	70 122	32 88	88 111
1865 (3 mo.) .	84 168	—	—	—
Totals . . .	429 796	385 549	200 427	455 591
	un. 3 ab. 3	un. 3 ab. 3	un. 3 ab. 3	un. 3 ab. 3

As might be expected, the winter months are those most prolific of this form of disease at all periods of life; but this is more especially the case amongst adults than children (in whom the summer is less than half that of the winter mortality). It is owing to the numerous deaths from this cause that the winter mortality appears so high in Tables VIII. and IX. That there is a greater relative tendency to inflammation of the respiratory organs in summer amongst adults, is probably owing to their liability to cold whilst warm from exertion in close workshops, mills, and other places.

The total number of deaths from this class of diseases during the five years, at all ages, has been 3,832—giving an annual average of 4·7 to each 1,000 of the population. As this is the most common form of death in Leeds, and therefore the more necessary to be considered fully, I have constructed the following table for the purpose of comparing it with the mortality in other places.

TABLE XIV.

Showing the proportion of deaths annually to each 1,000 of population, from diseases of the respiratory organs (not including Consumption), on an average of the years 1856 to 1862:—

<i>The whole of England</i>	3·1	Hunslet	3·6
Tadcaster	1·7	London	4·0
Ripon	2·0	Birmingham	4·7
Huddersfield	2·9	Leeds (Borough)	4·8
Otley	3·1	Sheffield	4·9
Bradford	3·3	Manchester	5·7
Knaresborough	3·34	Leeds (Township)	5·8
West-Riding	3·53	Liverpool	6·4
Halifax	3·54		

So that, taking the seven years 1856 to 1862, Leeds holds even a lower place than it does taking the last five years. It might *à priori* have been expected that country would suffer more than town districts from a class of diseases the exciting cause of which is generally cold. The contrary, however, is the case. Nothing can prove more conclusively than this fact, that habitual exposure to the weather produces immunity from the ill effects of its severity. Could a large number of individual cases be traced, it would probably be found that bronchitis, and its allied diseases, are most fatal to those who work or live in close unventilated rooms or houses, not only because they are more liable to suffer from cold when exposed to it, but because their vital power being weakened, they are more likely to succumb to its effects.

The great variation which there is between different towns and districts in respect of the mortality from this class of diseases may, I consider, be in great measure accounted for by the character of their soil. Thus chalk, sand, stone, and light soils allow of the percolation of moisture through them, which, in the case of clay soils, remains on or near the surface, ready, on changes of temperature, to rise in irritating fogs. If the land lies low, and near a considerable river—as is the case with a great part of Leeds, the amount of fog is still more increased. Of course, the colder the average temperature, and the more exposed a place is to easterly winds, the greater will be the number of deaths from this class of diseases.

Next to inflammatory diseases of the lungs, resulting from cold, consumption is the most frequent cause of death in Leeds, 1,521 deaths from this disease having occurred in the township alone during the last five years. The following table shows the position of Leeds relatively to the other places mentioned in the preceding tables. The eastern, south-eastern, and south-midland counties—embracing a total population of more than four millions—are taken for the purpose of affording means of comparison with a large district of country, almost exclusively agricultural, and under the most favourable atmospheric conditions. The eastern counties include Norfolk, Suffolk, and Essex. The south-eastern the extra-metropolitan districts of Surrey and Kent, also Sussex, Hampshire, and Berkshire. The south-midland include Middlesex (extra-metropolitan), Hertford, Buckingham, Oxford, Northampton, Huntingdon, Bedford, and Cambridge shires.

TABLE XV.

Showing the proportion of persons who die annually from Consumption, to every ten thousand persons living, on an average of the seven years ending December 31st, 1862:—

<i>The whole of England</i>	25·8	Leeds (Borough)	26·2
Tadcaster	19·7	Birmingham	26·4
South-Eastern Counties	22·5	West-Riding	27·8
South Midland Counties	22·8	London	28·0
Isle of Wight	23·2	Leeds (Township)	29·5
Ripon	23·2	Sheffield	29·8
Otley	23·3	Huddersfield	30·1
Knaresborough	23·7	Halifax	32·0
Eastern Counties	25·0	Manchester	34·7
Hunslet	25·8	Liverpool	37·6
Bradford	26·1		

The position of Huddersfield and Halifax in this table is quite unexpected, as they cannot otherwise be considered unhealthy. I at first thought I had made some error; but the figures given are perfectly correct. With regard to Halifax I am offered the following explanation by Dr. Alexander, of that town:—"The reasons I should assign for the excessive mortality from consumption in this neighbourhood over other towns in Yorkshire, are our rigorous climate, and the existence of numerous stone quarries, which involve flag facing and the chipping of stone by masons. Some years ago I demonstrated that this class of workmen seldom attain 45 years of age if constantly employed in that branch . . . and one death in eight of their entire mortality is from consumption. . . . That Manchester and Liverpool should be worse than Halifax in respect of consumption, would seem to imply that our climate cannot be the prominent cause, for their temperature is warmer than that of West Yorkshire. I am inclined to attach great importance—in the true tubercular form, particularly—to overcrowding and confinement, which prevent the due æration of the blood."

Of all classes the male population of the country is that most free from consumption, and compared with it the deaths amongst the female population of both town and country are in great excess; but these, again, are exceeded by the mortality amongst the male population of towns. The death rate in Leeds and London, from consumption, *in females alone*, is slightly, but very slightly, *below* that of the rest of England and of the West-Riding. This is a singular and interesting fact, but I have no means of positively ascertaining its truth with regard to other towns than London and Leeds (for there is no distinction made between the sexes in the reports of the Registrar-General, except in counties and in London). This must be owing to the better diet of the wives of workmen in towns. The difference between the male and the female population of the country can only be accounted for by the sedentary

habits of the latter, who, as in towns, take but little exercise in the open air, remaining from one week to another in the close atmosphere of their homes. As there is but little variation in the mortality from consumption between the female population of town and country districts, it follows that the difference which is found to exist, taking the total deaths of both sexes, must chiefly depend upon variations in the mortality of the male sex. This, except in a few instances, is the case; for, taking the deaths of females as a fixed point, we have, in London, 1,172 deaths of males to 1,000 deaths of females; in Leeds, 1,021 males; in the whole of England, 885 males; in the eastern counties, 774 males; and in the West-Riding, 826 males. In all these the proportion of deaths amongst females is nearly alike.

It will be allowed that a country labourer generally works as hard as a towns-man, so far as muscle and sinew go, and we may therefore conclude that hard work, whatever other ill effects it may have, does not tend to produce consumption. This holds good, however, only so long as the worker is freely exposed to the air. Except the greater prevalence of vice and drunkenness in towns, there is no other cause assignable for the fact that, for every 774 men who die from consumption in the eastern counties, about 1,172 die in London, and 1,021 in Leeds, than this—that in large towns like Leeds, most of the males are employed within doors, in shops, mills, and other similar places, breathing habitually a close and vitiated atmosphere. We have only to look at the men who, even in towns, work in the open air, and contrast their appearance with that of shopmen and millworkers, to be convinced of the truth of this explanation. There is only a difference of 1 in 10,000 between the deaths of females in the eastern counties and in Leeds. Taking these, therefore, as a fixed point, there have been more than 300 deaths of males in the borough of Leeds during the last five years in excess of what there would have been had the relative proportion between the sexes been the same as it is in the eastern counties. These have been, of course, chiefly adults, for the proportion of children who die from this cause is insignificant; probably many of these adults were fathers of families. We have only to conceive the misery and poverty produced, to estimate fully the interest and importance of the subject.

In order to ascertain the effects of each separate occupation in the production of consumption, I have constructed the following table, which embraces every death which has occurred in the township during the last five years, and also all those in the rest of the borough, the records of which are possessed by the Superintendent-Registrar.

TABLE XVI.

Showing the occupation of 2,494 persons who have died from Consumption in the Borough of Leeds, during the five years 1860 to 1864 :—

	Males.	Fe- males.		Males.	Fe- males.
<i>Professions :</i>			Chairmaker	1	—
Clergyman	1	—	Equestrian	1	—
Lawyers	2	—	Farmers and farm-servants	9	—
Civil engineer	1	—	Farriers	4	—
Music-master	1	—	Gardeners	3	—
<i>Sedentary and Domestic Oc- cupations not included in any of the Principal Trades of the Town :</i>			Grooms, coachmen, & ostlers	7	—
Wives	—	583	Porters	6	—
Widows	—	103	Gas inspector	1	—
Sons	281	—	Herring curers	2	—
Daughters	—	383	Hawkers	2	—
Accountant	1	—	Soldiers	5	—
Barbers and hairdressers	4	—	Sailors	3	—
Bookbinders	2	2	Watchman	1	—
Bakers	5	—	Watermen	4	—
Domestic servants	4	37	Milkmen	3	—
Brushmaker	1	—	Maltsters	5	—
Basketmaker	1	—	Policemen	3	—
Cashier	1	—	Potters	4	—
Clerks	28	—	Potdealer	1	—
Carvers and gilders	4	—	Road repairer	1	—
Milliners and dressmakers, &c.	1	34	Timekeeper	1	—
Clock and watchmakers	2	—	Commercial travellers	2	—
Cocoamaker	1	—	Timber merchant	1	—
Charwomen	—	6	Turner	1	—
Lodging-house keeper	1	—	Coopers	3	—
Lodger	1	—	Brewers	8	—
Printers	16	—	Blockcutter	1	—
Papermaker	1	—	Cotton merchant	1	—
Paperruler	1	—	Coal proprietor	1	—
Paperstainers	3	—	Loan agent	1	—
Spinsters	—	3	Miller	1	—
Students	3	—	Miners	5	—
Tailors	32	1	Mustard maker	1	—
Vocalists	—	2	Oil merchant	1	—
Comic singer	1	—	Oil miller	1	—
Waiters	3	—	Enginedriver	1	—
Saddlers	2	—	<i>Iron Trade :</i>		
Straw hatmaker	1	—	Boltmaker	1	—
Schoolmasters	4	—	Engineers	2	—
Schoolmistresses	—	5	Enginesmiths	5	—
Shoemakers	29	—	Engine tender	1	—
Upholsterers	1	1	Engine fitters	2	—
Pipemaker	1	—	Mechanics	44	—
Publicans	8	—	Machine fitters and smiths	29	—
Pensioners	17	—	Machine grinders	2	—
Sculleryman	1	—	Ironmoulders, founders, and foundry labourers	27	—
<i>Active Occupations, mostly out-of-doors, or, freely exposed to the air :</i>			Iron turners	6	—
Wheelwright	1	—	Puddlers	3	—
Butchers	10	—	Millwrights	6	—
Coachmaker	1	—	Filegrinders and cutters	5	—
Cabinetmakers	4	—	Gear and slaymaker	1	—
Collector	1	—	Hacklemakers	2	—
Cornfactors	2	—	Handlesetter	1	—
Cabdrivers	5	—	Ironmongers	2	—
Draymen and cartdrivers	10	—	Screwmakers	2	—
Cornmiller	1	—	Spindlemakers	3	—
Sweep	1	—	Toolfitters and smiths	2	—
			Wireworker	1	—
			Striker	1	—
			Whitesmiths and smiths	13	—
			Shearmaker	1	—

	Males.	Fe- males.		Males.	Fe- males.
Iron wheelmaker . . .	1	—	<i>Linen</i> weaver . . .	1	—
Modelmakers . . .	4	—	„ thread twister . . .	—	1
<i>Brass :</i>			<i>Leather</i> cutter . . .	1	—
Moulders, finishers, & turners	5	—	„ curriers and dressers	7	—
<i>Woollen Trade :</i>			„ skippers . . .	4	—
Clothiers . . .	6	—	„ finisher . . .	1	—
Clothweavers & mulespinners	21	1	„ tanners . . .	2	—
Clothdressers . . .	58	—	<i>Glass</i> merchant . . .	1	—
Clothfullers . . .	4	—	„ blowers & bottlemakers	5	—
Clothdrawers . . .	3	1	<i>Shopkeepers :</i>		
Mill hands . . .	15	18	Butter factor . . .	1	—
Burlers . . .	—	2	Greengrocers . . .	6	—
Slubbers . . .	8	—	Flour and provision dealers	7	—
Cloth capmakers . . .	—	2	Fishmongers . . .	2	—
Cordwainers . . .	10	—	Grocers . . .	7	—
Overlookers . . .	2	—	Hatter . . .	1	—
Merchants . . .	3	—	Jewellers . . .	3	—
Dyers . . .	10	—	Tobacconists . . .	2	—
Crabber . . .	1	—	Stationer . . .	1	—
Pattern makers . . .	2	—	Confectioners . . .	2	1
Tenterer . . .	1	—	Drapers . . .	9	—
Warehousemen . . .	13	—	Mathematical instrument		
Waste dealers . . .	2	—	„ maker . . .	1	—
Weavers . . .	3	7	Poultry dealer . . .	1	—
Woolsorters . . .	2	—	Chemists and druggists . . .	5	—
Woolspinners . . .	1	2	Marine store dealer . . .	1	—
Wool buyer . . .	1	—	Rag merchant . . .	1	—
Woollen merchants . . .	3	—	Ware merchant . . .	1	—
Woollen manufacturers . . .	2	—	<i>Building Trade :</i>		
Warpdressers and warpers	2	—	Builders . . .	4	—
Stitcher . . .	1	—	Stonemasons . . .	20	—
Wool carder . . .	—	1	Bricklayers . . .	3	—
Woollen filler . . .	1	—	Joiners . . .	34	—
Worsted reeler . . .	—	1	Labourers . . .	89	—
Yarnmakers and reclers . . .	2	—	Painters . . .	7	—
<i>Stuff</i> dresser . . .	1	—	Sawyers . . .	3	—
„ dyer . . .	1	—	Excavators . . .	4	—
„ weavers . . .	1	1	Turners . . .	2	—
„ presser . . .	1	—	Woodcutter . . .	1	—
<i>Carpet</i> weavers . . .	3	—	Stone quarriers . . .	8	—
<i>Silk</i> dresser . . .	1	—	Slaters . . .	2	—
„ weaver . . .	—	1	Plumber and glazier . . .	1	—
<i>Flax</i> mill overlooker . . .	1	—	Brickmaker . . .	1	—
„ dressers . . .	6	1	<i>Miscellaneous and Uncertain :</i>		
„ dealers . . .	3	—	Gentleman . . .	1	—
„ sorters . . .	3	—	Spinners . . .	1	1
„ spinners . . .	2	19	Assistant . . .	1	—
„ rulers . . .	—	5	Apprentice . . .	1	—
„ rover . . .	—	1	Journeyman . . .	9	—
„ ballers . . .	—	2	Agents . . .	2	—
„ spreaders . . .	—	2	Unknown and doubtful . . .	22	4
Total Males . . .				1,260	
„ Females . . .				1,234	

We cannot fail to be struck with the comparative absence of the wealthy classes from this fatal list, although what proportion of their families is contained amongst the wives, sons, and daughters is uncertain. There are 1 clergyman, 1 gentleman, 2 lawyers, 1 civil engineer, 2 engineers, 1 accountant, 1 coal proprietor, 1 oil, 1 cotton, and 1 timber merchant, 3 woollen merchants, and 3 simply styled “merchants,”—18 in all, or less than 4 a year!

This table would, doubtless, be more reliable did it embrace the deaths for a longer period than five years; for where the numbers in any occupation are inconsiderable, the deaths amongst persons following it are more liable to be the result of accidental circumstances. It is obvious, also, that the full value of such a table as this can only be obtained by having an accurate knowledge of the number of persons at present following each occupation. This information is, however, very difficult to obtain. The results of the following table must, therefore, not be received as absolutely correct, although it has been made as accurate as possible. The deaths of males only are taken, as there are no means of ascertaining the number of females following the different branches of industry. The first column of figures is the actual number of deaths taken from the preceding table. The second column represents the estimated numbers at present following each occupation, within the borough of Leeds; and the third, the proportion of deaths during the five years to every 100 of each occupation or trade.

Printers	16	300	5·3
Clerks	28	555	5·0
Pensioners	17	514	3·3
Labourers	89	2398	2·7
Publicans	8	341	2·3
Leather trade	15	644	2·3
Drapers	9	405	2·2
Joiners	34	1547	2·2
Tailors	32	1548	2·1
Stonemasons	20	1003	2·0
Stone-quarriers	8	445	1·8
Woollen trade	177	10243	1·7
Butchers	10	760	1·3
Shoemakers	29	2343	1·2
Grocers	7	571	1·2
Iron trade	167	14000	1·1
Police	3	260	1·1
Bricklayers	3	831	0·3
Plumbers	1	743	0·1

The incomparably greater mortality from consumption amongst clerks and printers points out, in a more forcible manner than even the relative mortality of townsmen and countrymen, or of countrymen and their wives, that the chief predisposing cause of consumption is want of air and exercise, and close confinement in heated rooms.

I find that the total number of deaths amongst clerks has been 78, so that the deaths from consumption form more than one-third of the whole. Their average age at death was 37 years, and only 6 reached 65 years of age. Printers are not a very temperate class of men, but they are more so in Leeds than in most towns, so that their liability to consumption cannot be

entirely traced to this cause. As they are only a limited class of men, their mortality from consumption during the last five years may have been exceptional. Forty-four clerks and printers, out of the 790 following both occupations, have died from this disease. Contrast this with the mortality, during the same period, amongst plumbers, postmen, plasterers, and police, 1,260 in number, of whom only 4 have died. There were no deaths from consumption amongst either postmen or plasterers. Of occupations in-doors, those involving a certain amount of bodily exertion are evidently less unhealthy than those in which there is little or none. Thus the deaths amongst milliners and female domestic servants are nearly alike; but the number of milliners must be very small compared to that of domestic servants. They are both confined almost entirely to the house. The better food of the latter class cannot account for the very great difference between them and the former class. Milliners must be at least ten times more liable to consumption than domestic servants are.

The number of deaths amongst pensioners must be attributed to many of them being already invalids when they retire from active service. The high mortality amongst labourers must be partly caused by their being frequent customers of the next on the list, but chiefly by their poorer food, and unhealthy crowded homes.

Of course the conditions precisely opposed to those which produce consumption favour exemption from it. These conditions are:—An out-of-doors occupation, or an in-doors one which necessitates a fair amount of physical exertion; good diet, with a proper amount of animal food; well-ventilated rooms; and steady, temperate habits. Any occupation, whether in or out of doors, favours the access of consumption if it overtaxes the strength, or if it necessitates the inhalation of fine particles of dust of an irritating nature.

It is a mistake to place a boy in a sedentary in-door occupation because he is delicate; and if there is hereditary consumption in his family, it is the very way to produce the disease. This, however, is frequently done, and may account, to some extent, for the mortality amongst clerks.

There have been 769 deaths from fever, in the township, during the last five years. This may seem, at first sight, but few for such a population; but these are only the deaths, and, on the calculation that for every death there were 5 recoveries (a higher rate of mortality than is probably really the case), there were 4,614 cases of illness from fever, or 923 cases annually. So that 1 person, on an average, out of every 141 has an attack of typhoid fever every year; and, supposing the average age at death to be 35, every child born in this town

runs 1 chance in 4 that he will suffer from typhoid fever at some period or other of his life, and, consequently, 1 in 24 that he will die from it—and this, a disease the propagation of which depends very much upon preventible causes.

Of these 769 deaths, 146 have occurred during the first three months of the several years, 125 during the second three months, 175 in the third, or summer quarters, and 203 in the last quarters. This accords with the experience of Murchison, who observes that, in London, “In the winter months (November, December, and January) the cases are much more numerous than in the summer months. The disease, which is at its maximum at the middle and end of autumn, continues to decrease until April, when it is at its minimum, and then progressively increases through the summer and autumn months. It would seem that the cause of the disease is only exaggerated, or called into action, by the *protracted* heat of summer and autumn, and that it requires the *protracted* cold of winter and spring to impair its activity or to destroy it.”*

The following table shows the position of Leeds relatively to other towns and districts; the figures speak for themselves, and require but little comment. It is a striking fact, however, that whereas from other diseases there is less mortality in the extra-urban parts of the borough than in the township, there is the same rate of mortality from fever in both, in spite of the purer air of the former. This is only accountable for by the as yet defective drainage and numerous nuisances in some of the out-townships.

TABLE XVIII.

Showing the number of persons who die annually from typhoid or typhus Fevers, out of every ten thousand persons living, on an average of seven years ending December 31st, 1862:—

<i>The whole of England</i>	8·3	Isle of Wight	9·4
Ripon	3·1	Huddersfield	9·6
Tadcaster	5·3	Hunslet	9·7
Knaresborough	6·6	Leeds (Township & Borough)	9·8
Halifax	7·4	Manchester	11·6
London	7·9	Liverpool	11·7
Bradford	8·1	Otley	11·7
Birmingham	8·7	Sheffield	12·0
West-Riding	8·9		

There can be no doubt that typhoid fever is propagated by infection, by means of some poison peculiar to the disease, and emanating from the bodies of the sick; but the question of the spontaneous generation of this poison *de novo* in drains and other places where animal and vegetable matters putrefy, is not yet decided. Thus, circumscribed epidemics occasionally occur in isolated villages or parts of the country, the origin of which,

* *Treatise on Continued Fevers*, p. 416.

from infection, it is difficult or impossible to trace; but the opinion is gradually gaining ground that such spontaneous generation is improbable, and that the poison of fever, like that of scarlatina, is only generated in the bodies of those already affected by the disease, and that, where no direct infection can be traced, the poison may have lain dormant in articles of clothing, or drains, for long periods of time, being at last called into activity by some circumstance favourable to its germination.

This opinion, however, should not influence communities in rendering them less careful to remove from their midst all sources of putrefaction in exposed or imperfect drains, stagnant water, &c.; for there can be no doubt about the action of these as powerful predisposing causes of typhoid fever, and, to a less degree, of scarlet fever and measles. I have seen many instances of this in Leeds, but none quite so marked as the following, which I take from Dr. Murchison's work on fever:—"In the autumn of 1857, fever broke out in Fleet Lane, London, while a sewer was being constructed. The sewer was open from June 29th to October 30th, and, during all this time, the inhabitants complained of the offensive smell. Soon after the sewer was opened diarrhœa began to appear, and typhoid fever followed. Of 140 families in the lane, hardly one escaped. Dr. Letheby and Mr. Ross, who investigated the circumstances, both attributed the fever to the sewer *miasm*. It appeared soon after the sewer was opened, and it disappeared when the sewer was closed, and all the time it was confined to the lane and immediate neighbourhood."*

There are innumerable cases on record almost equally striking. During the summers and autumns of 1861 and 1862, I attended, or was instrumental in sending to the House of Recovery, 63 cases of typhoid fever, and investigated the condition of the houses in which they occurred.

In seven the drains were good, the houses properly connected with them, and no smell complained of; and in seven I could not procure any reliable information, but they were most of them presumably good. In six there were no main drains in the streets, and the houses were drained into sump holes. In one there was no drainage of any description. In ten the drains ended in the earth at a little distance from the house. One occurred in a house unconnected with the drain, which ran up the centre of the street. In six the drains were perfect, but had no fall, and the sinks were stated to smell "awfully" in warm weather. In six more the smell was described in similar terms, but there was a good fall to the drain. In three the kitchen, in which the people chiefly lived, was apparently below

* *On Fevers*, p. 443.


the level of the drain. In three more there was a pigstye, and in four, out-buildings close to the house, all in a neglected state. Six cases occurred in one house, in which the drain appeared to be pretty good, but there was a large crack in the flagstone in front of the door, through which the smell of sewer was distinctly perceptible. In three more cases in one family, the dirty state of the house seemed to favour the access of fever, which, however, in this case, as in the last, could be distinctly traced to contagion. In none of these cases did I think that the defective sewerage, or other source of putrid effluvium, actually produced the fever, but favoured its access when once the poison was present in the neighbourhood.

No better proof can be given of the causes which favour the existence of fever than the condition of Otley, which, as shown by the last table, is actually worse than that of Liverpool and Manchester. I am informed by a medical man of that place that the "drainage is very bad; nuisances are allowed to accumulate and remain for a considerable time. The water supply is bad, the whole town being supplied by a small reservoir which is uncovered, and vegetable matter, during the autumn, falls into it and is allowed to remain."

In a paper by Dr. Druitt, of London, upon "*The Construction and Management of Human Habitations considered in relation to the Public Health*," read at a meeting of the Royal Institute of British Architects during 1860, the following passage occurs:—"A remarkable point is how scarlatina, diphtheria, putrid sore throat, and measles herd together. If three or four persons die in a house under different medical authorities one will return his death as measles, another his as diphtheria, another his as putrid sore throat, and another his as scarlatina. My own conviction is, that each of these maladies, with their cogeners small-pox and whooping cough, are so many products of putrid earth, putrid water, and putrid air, festering in the dwellings around us. . . . It is constantly observed by those who have to work the sanitary machinery of the Metropolitan Local Management Act, that all these diseases flourish and fall side by side, and that the accumulating evidence of a common origin is invincible."

When the residences of the fatal cases of fever in the borough of Leeds, during the last five years, are inserted on a map, it appears that there are two distinct districts of the town, east and west, which have especially suffered from the presence of fever. These are separated by the district from Queen Street and Park Square on the west, to Vicar Lane on the east, which has been almost entirely exempt. In the west end of the town the most numerous deaths have occurred in the small streets north and south of West Street, especially Chatham

Street, Howard Street, Lower Hanover Street, Charley Street, and St. Philip Street, and in the small streets on the Kirkstall Road west of North Hall Street. The eastern fever district is much more extensive, and includes generally the whole of the populous districts east of a line drawn through Vicar Lane to some distance north and south. The *foci*, however, are—1, the streets east and west of Regent Street; 2, the courts and small streets opening out of York Street, Duke Street, and St. Peter's Square; 3, the courts in George's Street, Back George's Street, Ebenezer Street, and Union Street; 4, the streets opening into York Road and Shannon Street; 5, the streets situated on the top of Richmond Hill; 6, the narrow streets on the north side of Kirkgate; 7, the small streets opening into Mushroom Street, Newtown. There has also been a great amount of fever at Hunslet in the smallest and most dirty streets; and in Holbeck, in Sweet Street and neighbourhood, and in Derwent Street, Water Lane. I find that the worst drained neighbourhoods, and those containing most nuisances, are not *necessarily* those which suffer the most from fever. Thus, two of the worst neighbourhoods in these respects are Briggate, with the yards opening into it on both sides, and the north-west side of Meadow Lane; but both these have been almost exempt from fever.

On the other hand there are many streets well drained and well paved, in which there have been numerous deaths. Inefficient drainage has, doubtless, much to do with the existence of fever. But it appears to me that, irrespective of drainage altogether, there is most fever in those streets and courts which are the narrowest, the dirtiest, the most crowded, and the worst ventilated, owing to their being closed at one or both ends by buildings, so that there is seldom a free current of air through them. The connection with street drains seems often to be more a disadvantage than not, for in the parts of the town on a low level, the air from the drains enters the houses freely, whenever rain follows a dry season. The small cups generally used as sink traps are inefficient, for they do not allow of the free passage of water, and are consequently frequently removed. A figure of  bend in the sink-pipe is more efficient, but the curves should be made deeper than is generally done. Much may doubtless be done by removing nuisances, by supplying water to each house, by good drainage, and by the erection of houses for the working classes, so as to prevent the necessity for overcrowding; but it must not be hoped that by these means fever can be entirely prevented, for it evidently spreads like other epidemic diseases—by infection—but is more liable to attack those prepared for its reception by debility or by some unfavourable sanitary condition of their residence.

The following tables show the prevalence in Leeds, according to season, of the other febrile diseases depending on special and distinct poisons, propagated from one person to another by infection, and the spread of which is favoured by the same causes which favour the access of typhoid fever.

It must be remembered, however, that in none of these can the connection between these causes and the fever be traced so clearly as it can in the case of typhoid fever.

TABLE XIX.

SHOWING THE DEATHS FROM SCARLET FEVER IN THE TOWNSHIP OF LEEDS DURING THE LAST FIVE YEARS, ACCORDING TO SEASON.

	Jan., Feb., March.	April, May, June.	July, Aug., September.	Oct., Nov., December.	Totals.
1860 (9 mo.) .	—	6	12	5	23
1861	4	6	8	6	24
1862	5	8	22	123	158
1863	189	148	115	93	545
1864	83	31	47	135	296
1865 (3 mo.) .	74	—	—	—	74
Totals . .	355	199	204	362	

TABLE XX.

SHOWING THE DEATHS FROM MEASLES IN THE TOWNSHIP OF LEEDS DURING THE LAST FIVE YEARS.

	Jan., Feb., March.	April, May, June.	July, Aug., September.	Oct., Nov., December.	Totals.
1860 (9 mo.) .	—	89	70	28	187
1861	11	7	10	9	37
1862	12	31	26	31	100
1863	14	45	11	10	80
1864	6	12	13	20	31
1865 (3 mo.) .	4	—	—	—	4
Totals . .	47	247	130	98	

TABLE XXI.

SHOWING THE DEATHS FROM SMALLPOX IN LEEDS DURING THE LAST FIVE YEARS.

	Jan., Feb., March.	April, May, June.	July, Aug., September.	Oct., Nov., December.	Totals.
1860 (9 mo.) .	—	6	0	0	6
1861	1	0	1	0	2
1862	1	2	0	1	4
1863	7	24	6	8	45
1864	14	12	1	2	29
1865 (3 mo.) .	0	—	—	—	—
Totals . .	23	44	8	11	

It is evident that epidemics of scarlet fever, measles, and smallpox do not depend upon the season of the year, but come and go irrespectively of the heat of summer or the cold of winter, so that, in this point, they differ entirely from typhoid fever, the dependence of which upon the season has been shown.

An atmosphere charged simply with the emanations resulting from the putrefaction of drainage matters, out-buildings, cess-pools, and the animal matters with which the dwellings and persons of the lowest class become charged, produces a low state of health in those who are constantly exposed to it; and this is more marked in the women and children than in the men, owing to their passing the whole of their time within their dwellings, or in their precincts. During the intense heat of summer and autumn, a great amount of diarrhœa results. This is particularly fatal to children, who die from this cause, in the township of Leeds, during the months of July, August, and September, *at the rate of rather more than three every two days*. The disease, though more common amongst adults, is less fatal. There can be no doubt as to the cause assigned being the true one. How else can the very slight winter mortality be accounted for, except by the cold of that season checking the putrefaction of refuse organic matters? The first three months of the present year were the coldest we have had for several years, and during them only two deaths occurred from diarrhœa amongst infants. The two following tables show the deaths from diarrhœa and dysentery, according to season, in those above and those under three years of age.

TABLE XXII.

SHOWING THE DEATHS FROM DIARRHOEA IN THOSE ABOVE THREE YEARS OF AGE.

	Jan., Feb., March.	April, May, June.	July, Aug., September.	Oct., Nov., December.	Totals.
1860 (9 mo.) .	—	5	13	7	25
1861	5	13	7	5	30
1862	7	6	4	6	23
1863	8	19	8	2	37
1864	13	6	12	4	35
1865 (3 mo.) .	4	—	—	—	4
Totals . .	37	49	44	24	

TABLE XXIII.

SHOWING THE DEATHS OF INFANTS FROM DIARRHOEA DURING THE LAST FIVE YEARS IN THE TOWNSHIP OF LEEDS.

	Jan., Feb., March.	April, May, June.	July, Aug., September.	Oct., Nov., December.	Totals.
1860 (9 mo.) .	—	13	56	23	92
1861	8	16	166	24	214
1862	4	11	93	17	125
1863	10	20	214	17	261
1864	9	11	163	17	200
1865 (3 mo.) .	2	—	—	—	2
Totals . .	33	71	692	98	

I find, on comparing the deaths from fever, in the latter halves of the various years, with the amount of rain which fell, with the number of rainy days, and with the heat of the summer, that the prevalence of fever does not coincide with the greatest heat, but rather with the absence of rain. Thus, there were the most deaths in the latter halves of 1864 and of 1862, in which there were the fewest rainy days, and less fall of rain than in any of the other three; and there were the fewest deaths in the latter half of 1861, in which half-year there were the greatest number of rainy days. Deaths amongst

children from diarrhœa, on the other hand, are in direct proportion to the *heat* of the season. Thus, the highest average temperature occurred in 1863, and this is the year when the greatest number of deaths from diarrhœa occurred. The lowest average temperature occurred in 1860, in which year the deaths from diarrhœa were less than one-third their number in 1863.

The deaths from apoplexy form a numerous class. This cause of death, however, does not vary much in different places. It is rather more common in large towns than in country places. Out of every 10,000 people, 4·42 die from it annually in the whole of England, and nearly the same in most of the country districts. In London, 5·41 die from it annually; in Leeds, according to the statistics of the last five years, exactly 6.

It is not my intention to consider separately every cause of death in Leeds, but only the principal ones, and those which admit, to some extent, of remedy. It may be broadly stated, however, that nearly every fatal disease is predisposed to by that low state of health which results from want of air and light, and by the habitual respiration of the organic matters constantly present in the air of crowded parts of a town. There is, however, no chemical difference between the air of the centre of a town and that of the country, as far as regards the actual amount of carbonic acid and oxygen. The former is not in any appreciable excess, and the latter is not in any appreciable deficiency.

Scrofula, rickets, and many other diseases of children, are especially predisposed to by deficiency of light, which is almost as essential to health as pure air is. Children reared in cellar kitchens, or in dark small-windowed houses, with a north aspect, are always delicate, and frequently scrofulous. This want of light is sometimes increased by the use of dark wall-papers. A very light paper or whitewash is far preferable. No one who will take the trouble to examine the state of the small courts and yards of the lower parts of this town can doubt that the dwellings of the numerous class which inhabits these places must be at the root of much of the excessive mortality. There are families living in cellars about as good as a gentleman's coal-place, in which they eat, sleep, and wash. (The latter is, however, generally omitted as inconvenient.) It is a common plan to have the out-buildings in front of the door, or a blank wall, or another house a few yards off, so that proper ventilation is prevented, and most of the light excluded. There are houses so dark that it is difficult at first to distinguish objects in them, even on a bright sunny afternoon. I have questioned many of the tenants of these places, chiefly Irish; they complain of the places they are compelled to inhabit—some bitterly—but state that they cannot procure any better

habitations. How can such people be morally and religiously raised, so long as one great cause of their demoralization still remains in its full intensity? The wretched state of their houses, the desire for pleasure, when, at their own fireside, only misery is possible, must have much to do with the drunken and vicious habits of these people.

In conclusion, I may observe that the power of diminishing the mortality of a town is immeasurably increased by a comprehensive knowledge of the various causes of mortality. Such knowledge is comparatively useless when known only to a limited class. I have endeavoured to show the chief causes of the most fatal forms of disease in Leeds, and to point out its relative position to other towns and districts with regard to the prevalence of these diseases.

It rests with the community at large to acquaint themselves with facts, the knowledge and right application of which cannot fail to be productive of public, as well as of individual, benefit.

